BLUEBEAM
A NEMETSCHEK COMPANY

Building the Future: Bluebeam AEC Technology Outlook 2025

Construction industry firms are eager and willing to accelerate investments in emerging technology, particularly artificial intelligence, yet still see challenges with training and acquiring workers to maximise value from these new capabilities.

EXECUTIVE SUMMARY

As 2024 ends, construction firms continue to navigate a truly transformative – and challenging – era.

With the remarkable emergence of new and innovative technology, particularly artificial intelligence (AI) into every aspect of the global economy, companies across the architecture, engineering and construction (AEC) spectrum have made tremendous strides finding value from these new tools. And as macroeconomic headwinds in the form of rising costs and a persistent worker shortage have put pressure on the industry, being able to do more with less using technology has become a top priority for many firms.

What's more, technology hasn't just helped construction firms become more productive and efficient, but it has also helped make their operations more environmentally sustainable – a significant development as the world continues to face the threat of a warming climate.

Still, challenges abound. To better understand how the construction industry is tackling these challenges, Bluebeam partnered with a third-party research firm in the summer of 2024 to poll a statistically representative sample across the globe on issues ranging from AI enthusiasm and adoption to sustainability and more.

This report highlights the most significant findings, which reveal a construction industry enthusiastic about the future but still facing some obstacles to reaching its potential.

STUDY OVERVIEW:

The research survey was conducted online by Hanover Research, with respondents recruited via a panel.

Respondent qualifications included:

- 18 years or older, employed full time in US, Canada, France, Spain, UK, Germany, Australia or New Zealand
- Employed at an architecture, engineering or construction firm at manager level or above
- Is a dedicated decision-maker or influencer at a manager level or above for technology usage at their organisation
- Has at least some knowledge of their organisation's building lifecycle management process

KEY SURVEY OBJECTIVES:

How do respondents currently use technology in their projects and processes?

Do respondents use AI?

How much budget, if any, is dedicated to AI?

Will AI usage and budgets increase in the coming year as well as the next five years?

How is technology used through handoffs between stages?

What technologies do respondents use, and through which media (desktop, laptop, mobile app)?

To what extent are respondents still using pen and paper rather than digital tools?

What benefits do respondents most experience with technology?

What challenges do respondents experience with technology and digitalisation?

What overall challenges do respondents experience in the building lifecycle?

HEADLINE FINDINGS FOR 2024:

Artificial intelligence is on the rise – and companies are willing to invest significantly in the technology. AI implementation is especially prevalent in the design and planning phases.

25%

Some companies are investing as much as a quarter of their IT budgets in AI technology, and respondents said they plan to increase AI budget allocation in the coming five years.

30%

Lack of training, integration and technical challenges continue to weigh down the industry's ability to adopt technology; roughly one-third of respondents in the construction segment reported these issues as major challenges.

50%

While environmental sustainability is largely seen as critical to the construction industry's future, just half of respondents said sustainability efforts at their companies have been successful.

RESPONDENT SEGMENTATIONS:

Region

47%

North America (US, Canada, Mexico)

42%

EMEA (Europe, Middle East, Africa)

11%

APAC (East Asia, South Asia, Southeast Asia and Oceania)

Industry

11%

Architecture

71%

Construction

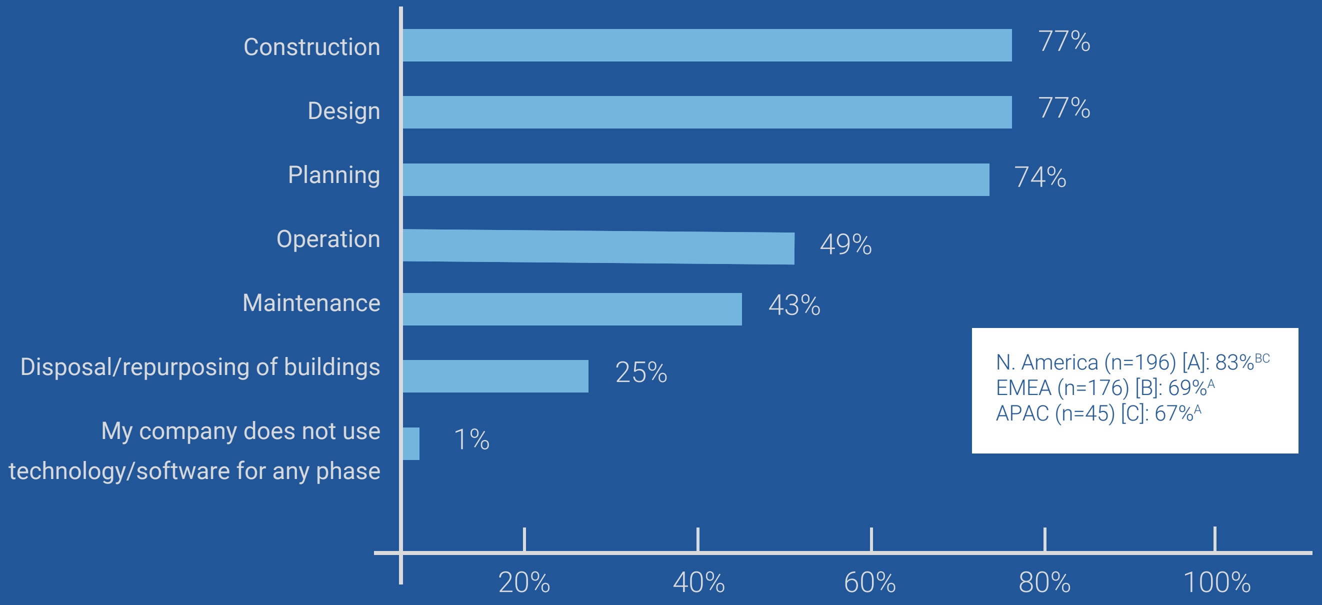
18%

Engineering

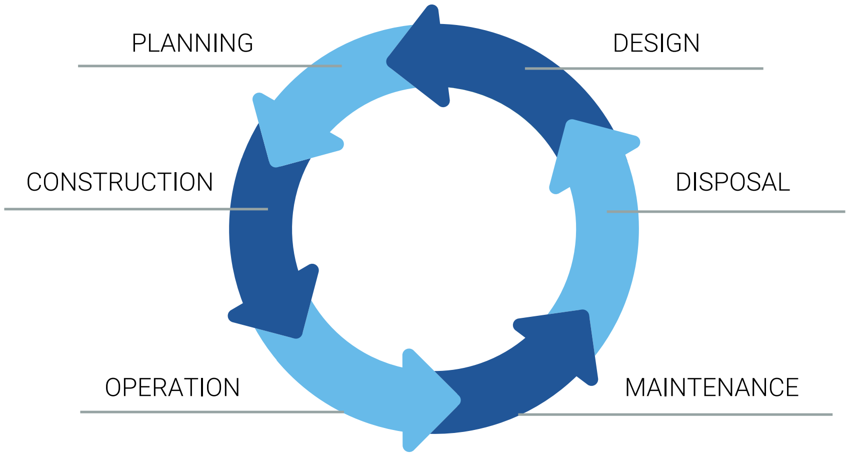
TECHNOLOGY USE IN THE BUILDING LIFECYCLE:

Technology's use in the industry is most common in the construction, design and planning phases, with respondents from North America (83%) being significantly more likely to use technology in the planning phases than respondents from EMEA (69%) or APAC (67%).

TECHNOLOGY USAGE IN BUILDING LIFECYCLE PHASES

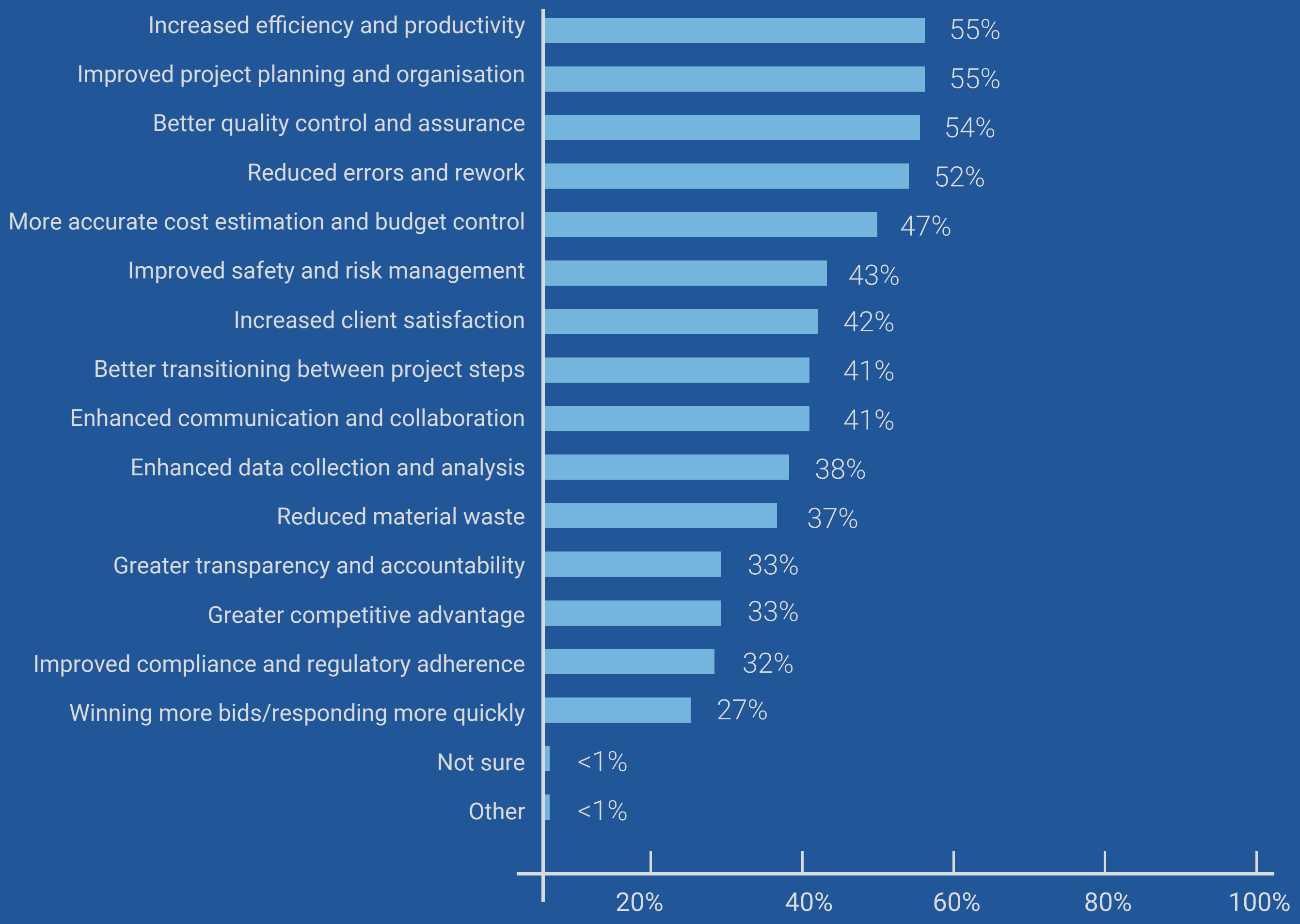


BUILDING LIFECYCLE:


PLANNING
DESIGN
CONSTRUCTION
DISPOSAL
OPERATION
MAINTENANCE

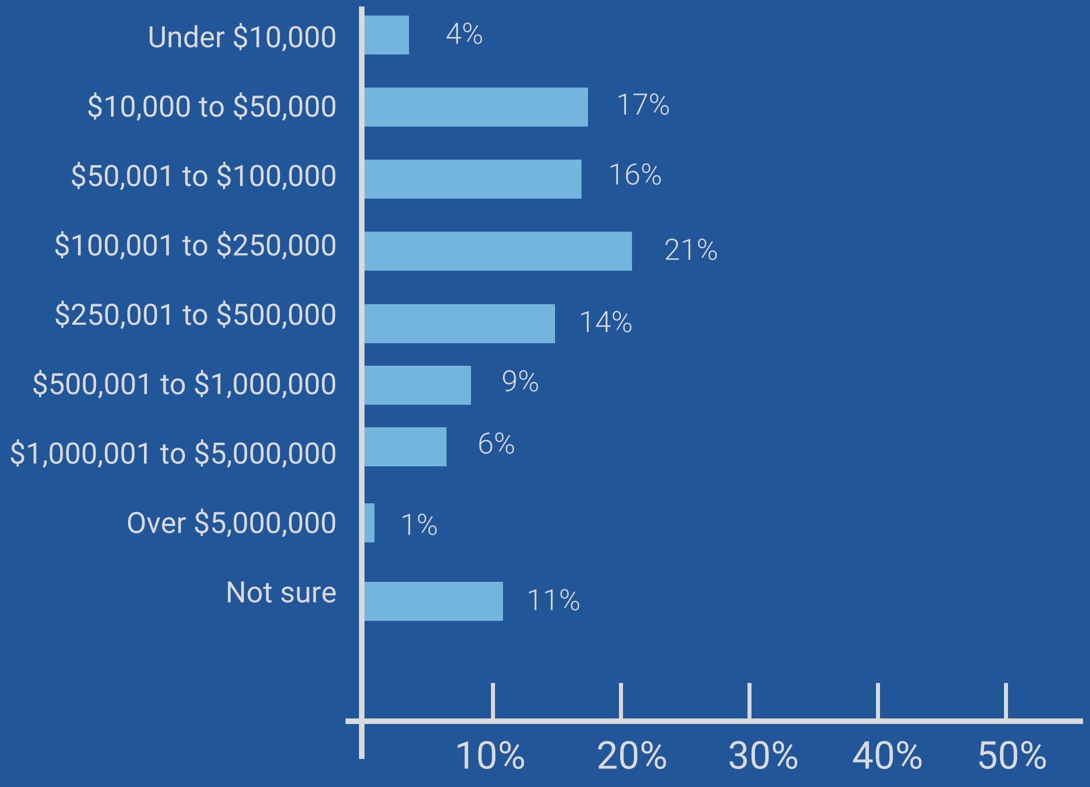
The small number of respondents who said they don’t use technology in any phase cite lack of leadership support for specific needs as reasons why.

BENEFITS OF TECHNOLOGY USAGE IN BUILDING LIFECYCLE



TECHNOLOGY USE = MAJOR COST SAVINGS

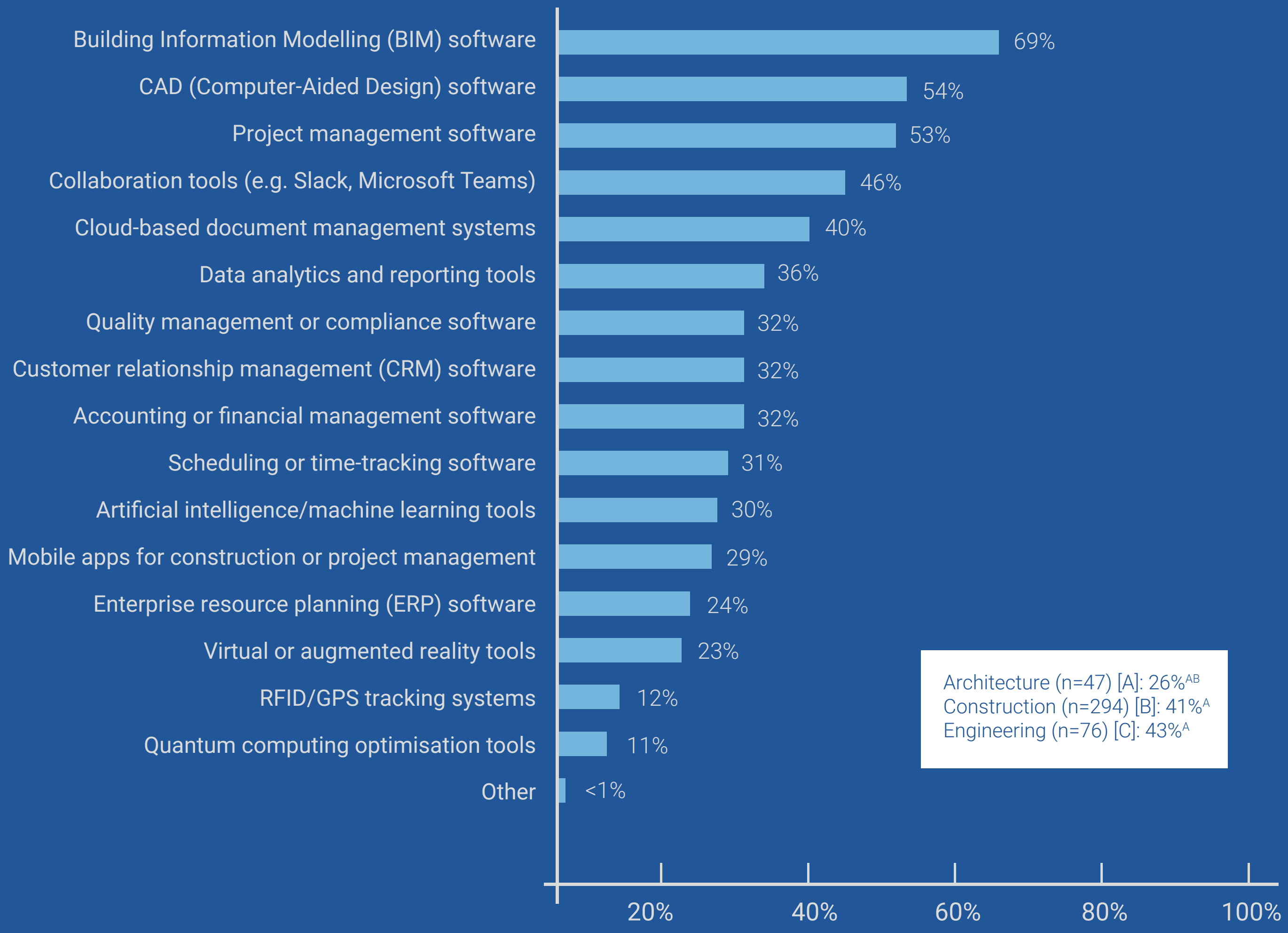
By and large, adopting digital tools has helped AEC firms save a significant amount of money, with about one-third of respondents in the survey saying they've seen savings between $100,001 and $500,000.


COST REDUCTION FROM TECHNOLOGY USAGE

BIM LEADS THE WAY

Building information modelling (BIM) is the most-used technology in the building lifecycle, followed by Computer-Aided Design (CAD) and project management software. One survey finding that stood out was professionals in architecture were less likely than those in construction or engineering to use cloud-based document management tools.

TYPES OF TECHNOLOGY USED IN BUILDING LIFECYCLE

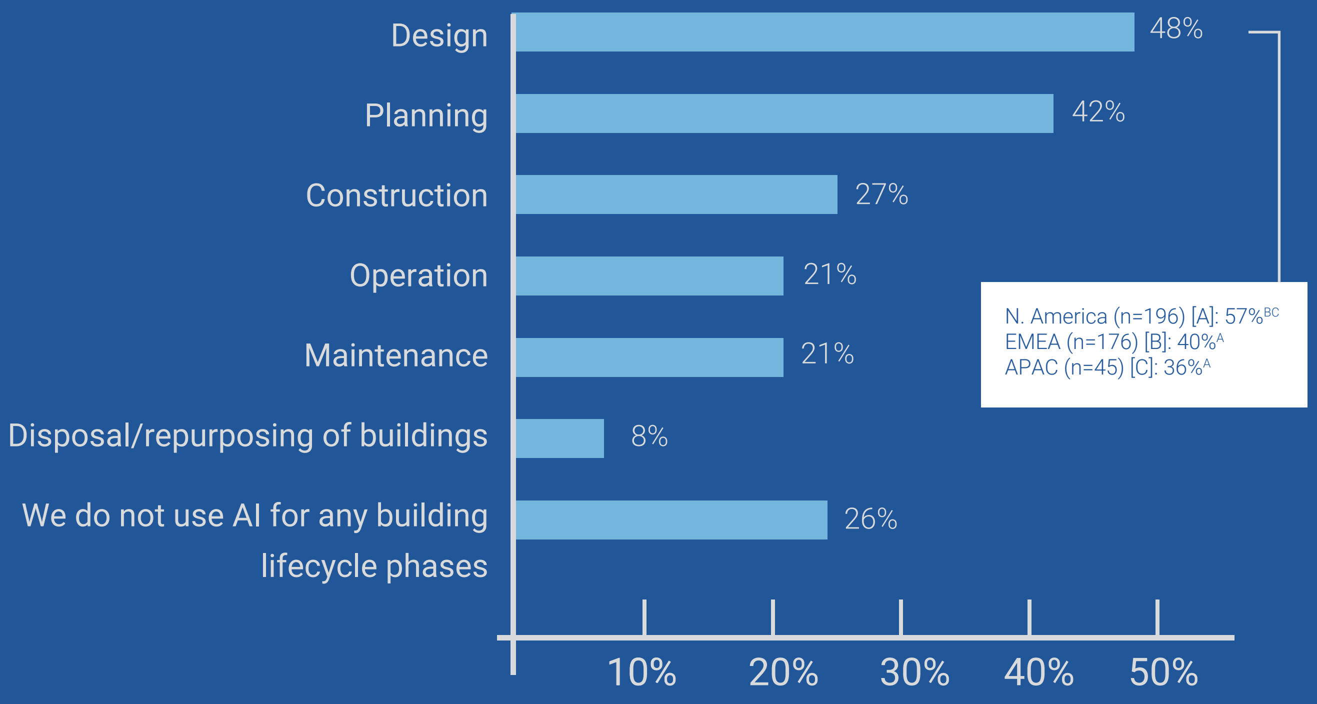


Architecture (n=47) [A]: $26\%^{AB}$
Construction (n=294) [B]: $41\%^{A}$
Engineering (n=76) [C]: $43\%^{A}$

AI APPLICATION IN CONSTRUCTION MOST SEEN IN DESIGN AND PLANNING:

While around a quarter of respondents said they don’t use AI in any building phase, the majority that said they do are using it for project design and planning, and most say they believe the technology is highly important in the building lifecycle.

USE OF AI IN BUILDING LIFECYCLE PHASES



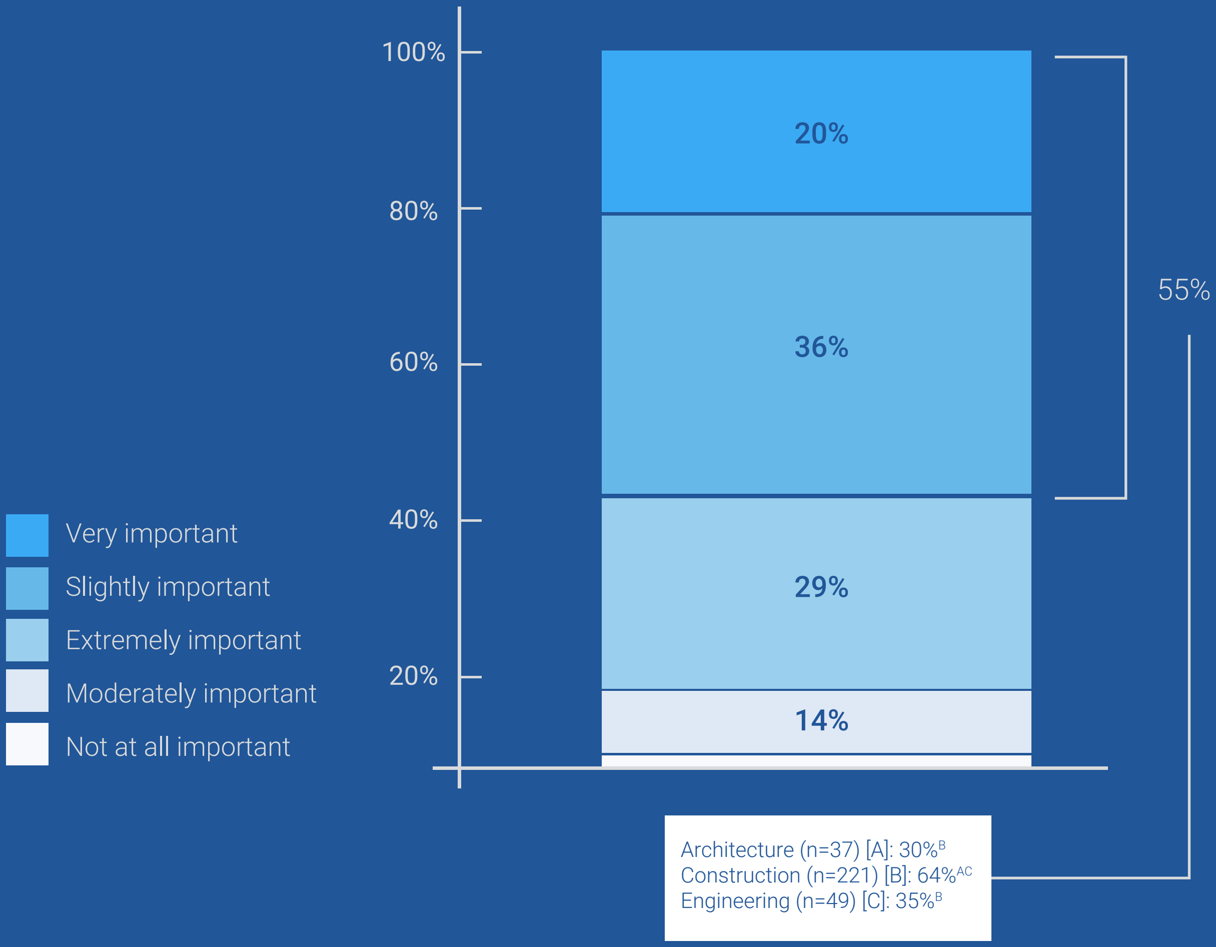
N. America (n=196) [A]: 57%^{BC}
EMEA (n=176) [B]: 40%^{A}
APAC (n=45) [C]: 36%^{A}

Finally, even respondents who say they aren't currently using AI report its use and value is likely to increase at their firms in the next five years. More than three-quarters said they plan to use and invest in more AI in the near future.

Firms like Kimley-Horn, based in Raleigh, North Carolina, with offices across the country, aren't diving headfirst into the AI craze but are taking a more cautious approach, following the trend and making small, calculated investments and observing the results.

> *'AI developments are real and will be transformational. Kimley-Horn is absolutely staying aware of how the technology is progressing. We're talking to our clients about AI, and we're looking at risks. We are very much in the "fast follower" category when it comes to investing and implementing AI.'*
>
> – Mark Bishop, Senior Vice President, Kimley-Horn

IMPORTANCE OF AI IN BUILDING LIFECYCLE

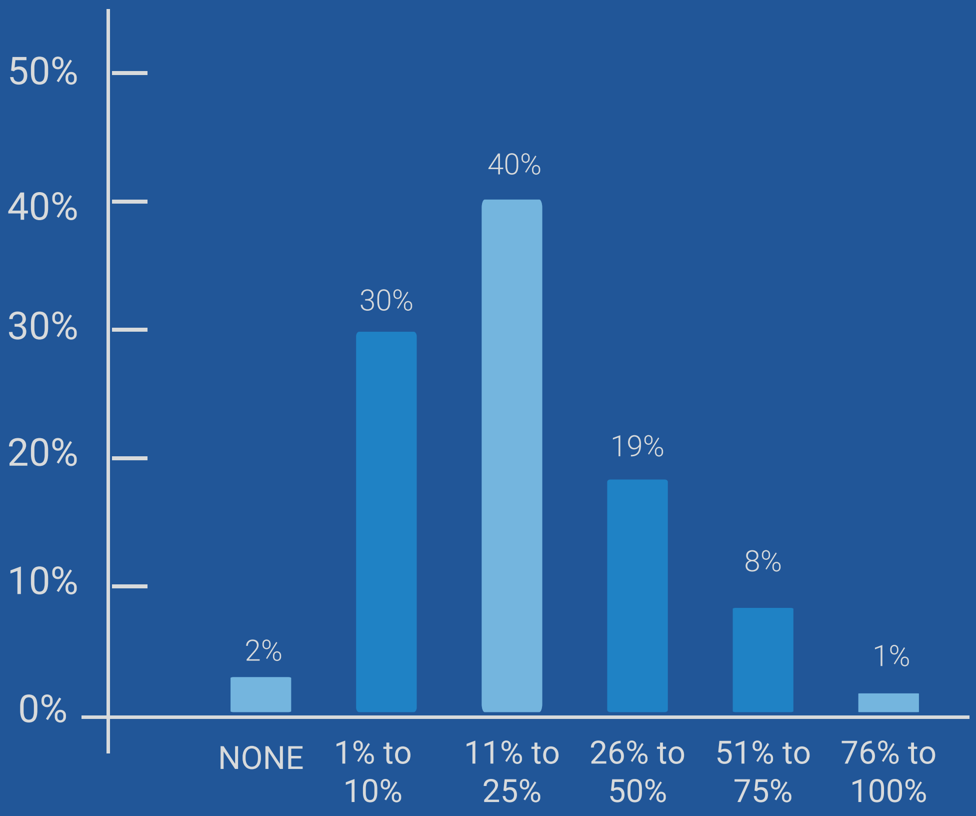


Architecture (n=37) [A]: 30%^{B}
Construction (n=221) [B]: 64%^{AC}
Engineering (n=49) [C]: 35%^{B}

AI BUDGET ALLOCATION TAKES HOLD

Most companies enthusiastic about the potential for AI are making some investment in implementing the technology at their organisations. Around 70% of respondents reported allocating at least 1% of their current budgets to AI, and almost half of respondents (40%) said they're allocating between 11% and as much as 25% of budgets to AI.

IT BUDGET ALLOCATION TO AI



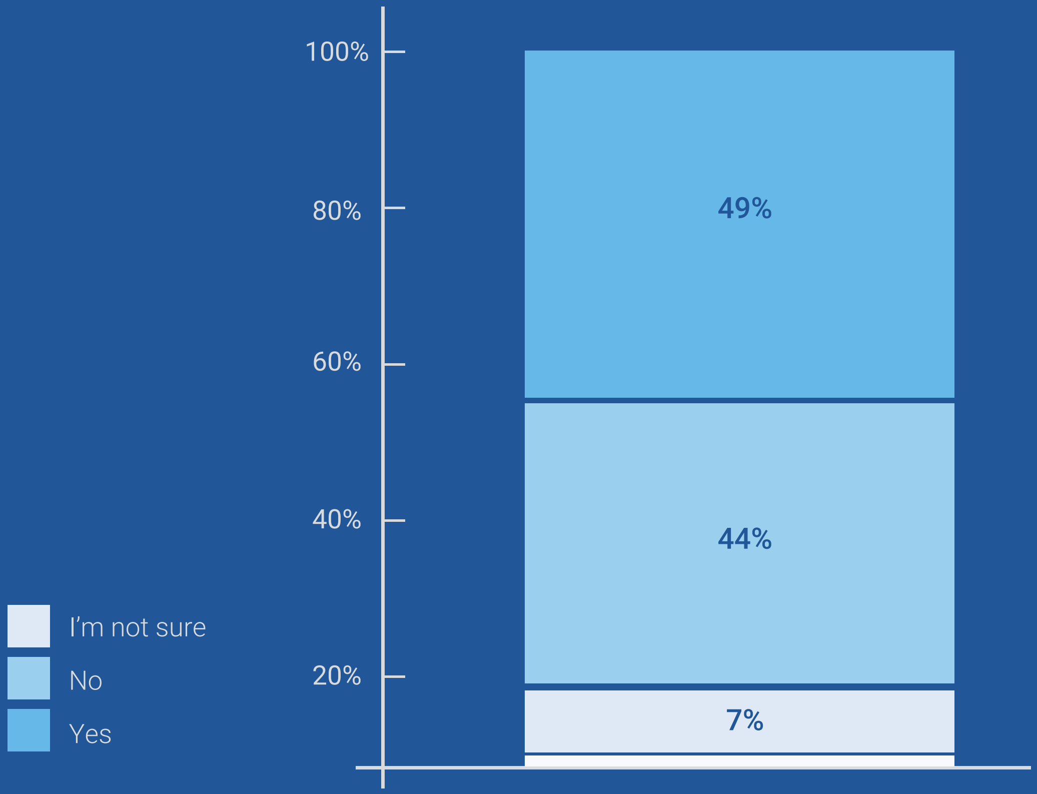
AI BUDGET ALLOCATION TAKES HOLD

Those in the survey who reported they are concerned about AI to the point where it's stopped them from making investments in the technology say they're worried about potential government regulations.

Construction industry companies also have a role to play in the ethical and safe implementation of AI.

> *'It is of the utmost importance that governments, companies and individuals ensure the safe, secure and ethical development and deployment of AI technologies. I believe it will ultimately fall to governments to set standards and laws around what those parameters will be. But while governments will undoubtedly play a critical regulatory role, the speed of AI adoption will require that company executives create ethical guidelines of their own around AI. By emphasising trustworthy AI principles, such as privacy and data security, transparency, explainability and governance, the construction industry can harness the benefits of artificial intelligence while ensuring ethical compliance and an environment for innovative, sustainable growth.'*
>
> – Usman Shuja, CEO, Bluebeam

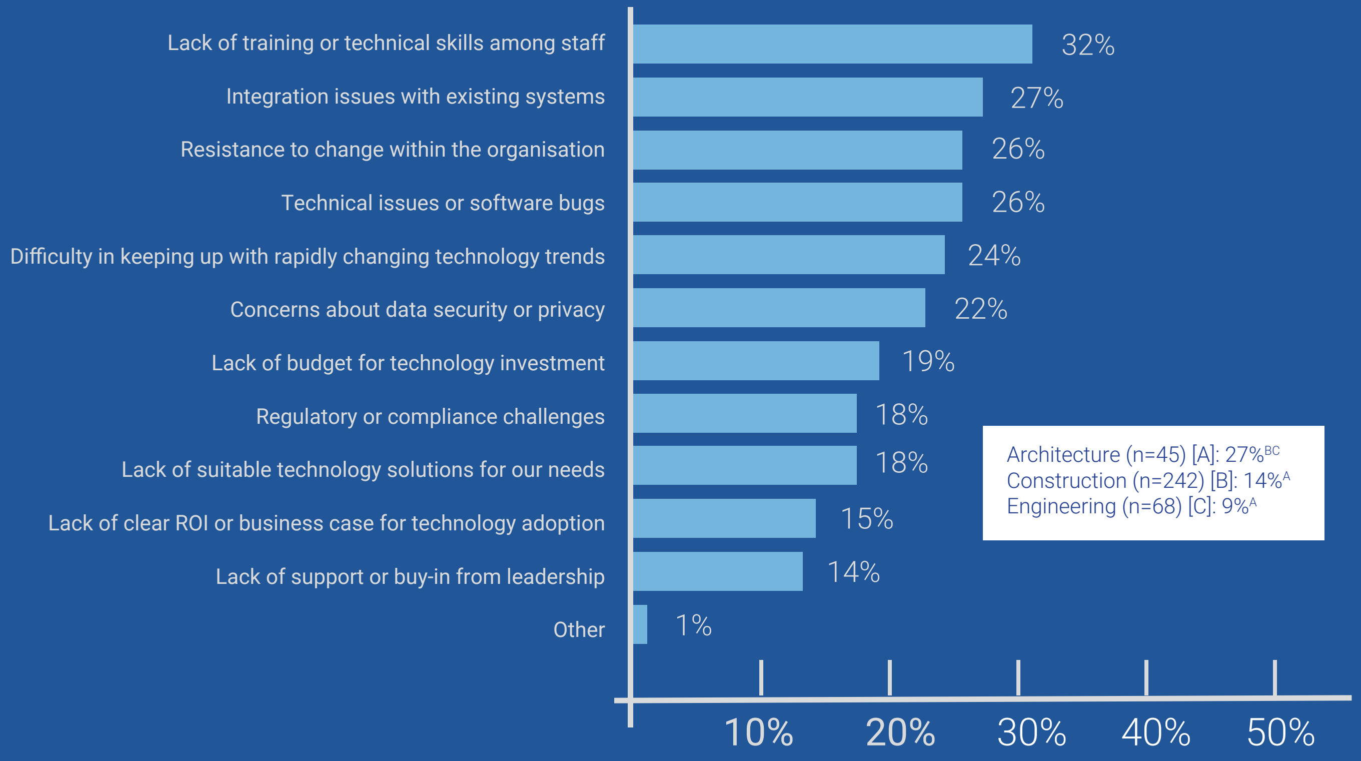
IMPACT OF AI REGULATION CONCERNS ON AI IMPLEMENTATION



LACK OF TRAINING & SKILLS POSES MAJOR OBSTACLE

Despite industry enthusiasm for adopting new digital tools, including AI, construction firms still struggle when it comes to training or finding employees with the skills to use these technologies. Other roadblocks to greater technology adoption include integration issues with existing systems and organisational resistance to change. Some companies still report a lack of clear return on investment or business case for technology adoption.

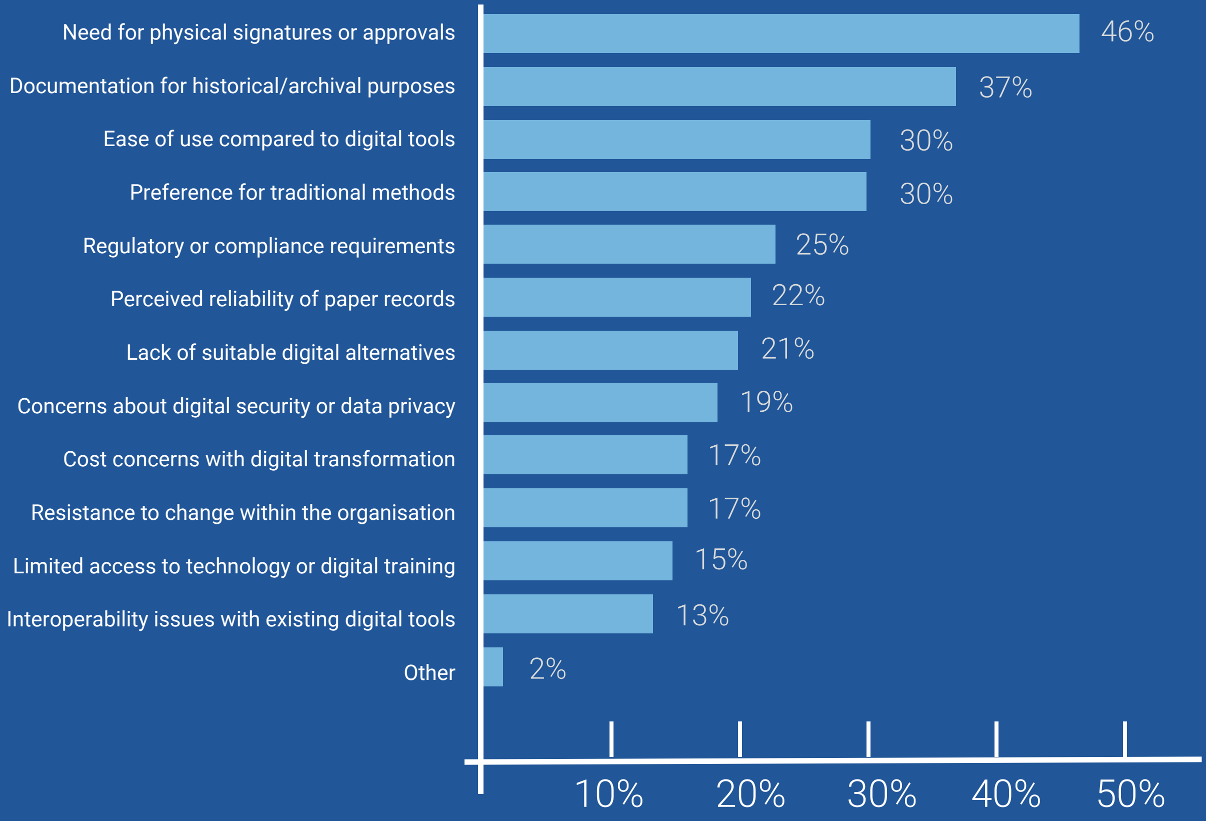
CHALLENGES IN TECHNOLOGY ADOPTION AND DIGITISATION



PAPER PREVAILS – FOR SOME

Even though digital tools are largely pervasive throughout the construction industry, paper hasn't been wiped out yet. While about a quarter of respondents (28%) said they don't use paper in any construction phase, the majority that still do said the need for physical signatures or stakeholder approvals is keeping paper relevant in their project operations. This is despite the fact that many of today's digital tools, including Bluebeam, provide solutions for signatures and approvals.

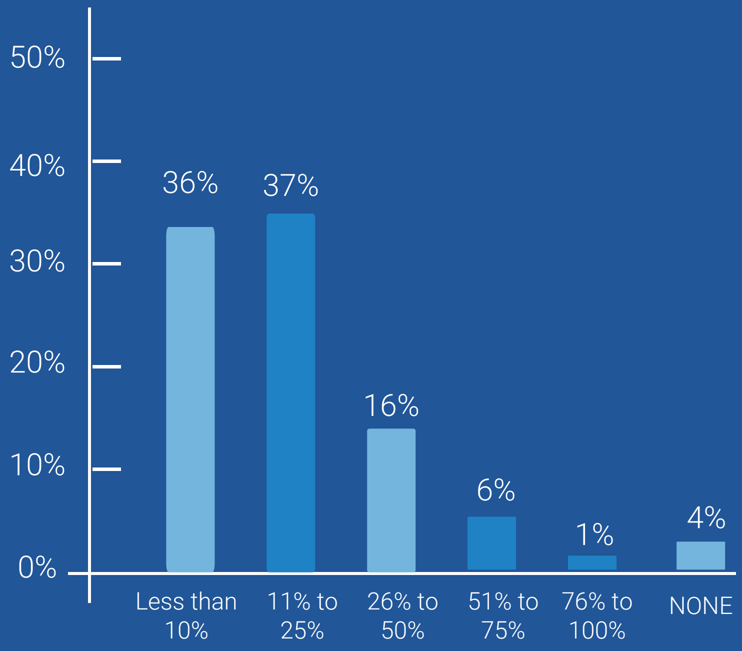
REASONS FOR USING PAPER PROCESSES IN BUILDING LIFECYCLE



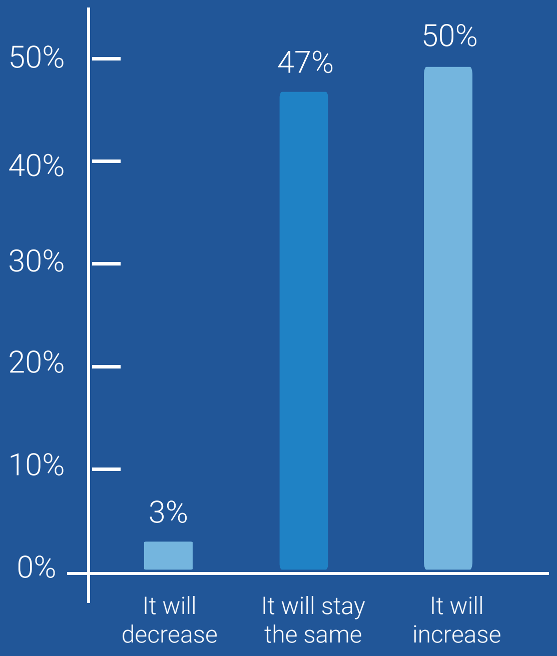
SUSTAINABILITY ON SHAKY GROUND?

Despite widespread construction industry agreement on sustainability's importance to the industry's future, most respondents surveyed said their companies allocate less than 25% of their budgets to sustainability initiatives. However, respondents also said they predict sustainability budgets will increase in the next year.

BUDGET ALLOCATION TO SUSTAINABILITY INITIATIVES



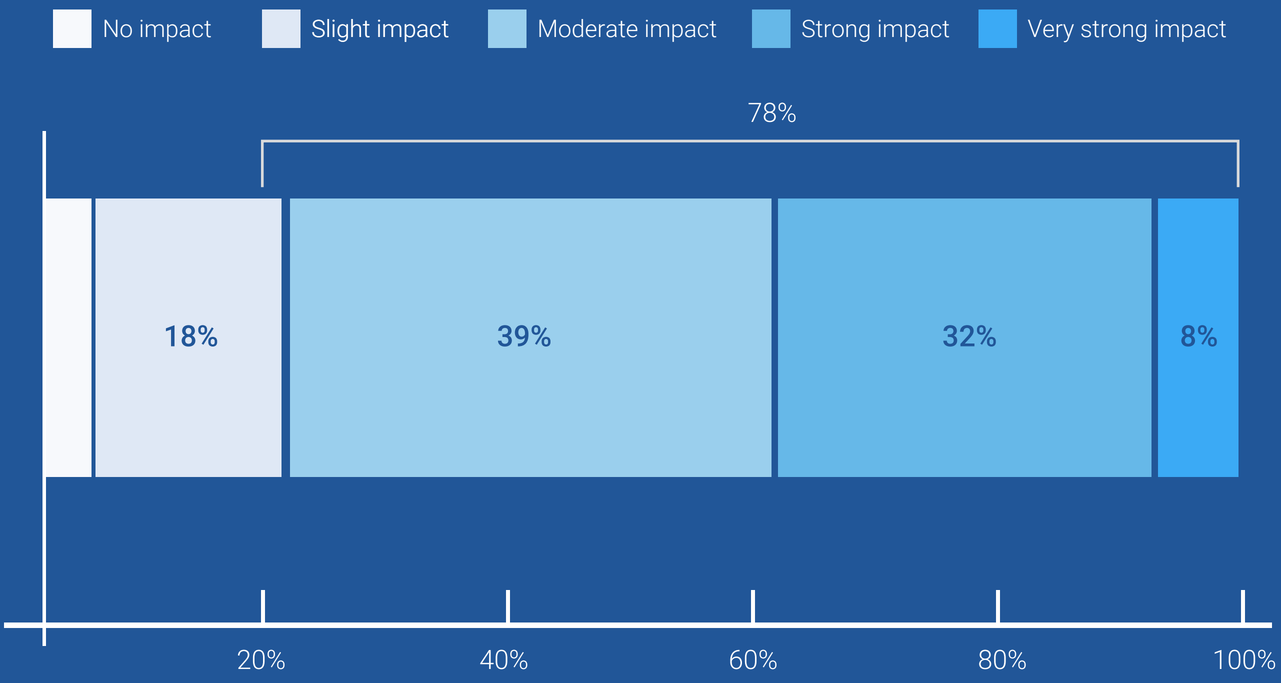
CHANGES IN SUSTAINABILITY BUDGET IN 2025



ENVIRONMENTAL LAWS FALL FLAT

While some regions of the world have put forth legislation to make the construction industry more sustainable, few respondents believe such laws have had a strong impact on companies' sustainability plans.

IMPACT OF ENVIRONMENTAL LAWS ON SUSTAINABILITY PLAN



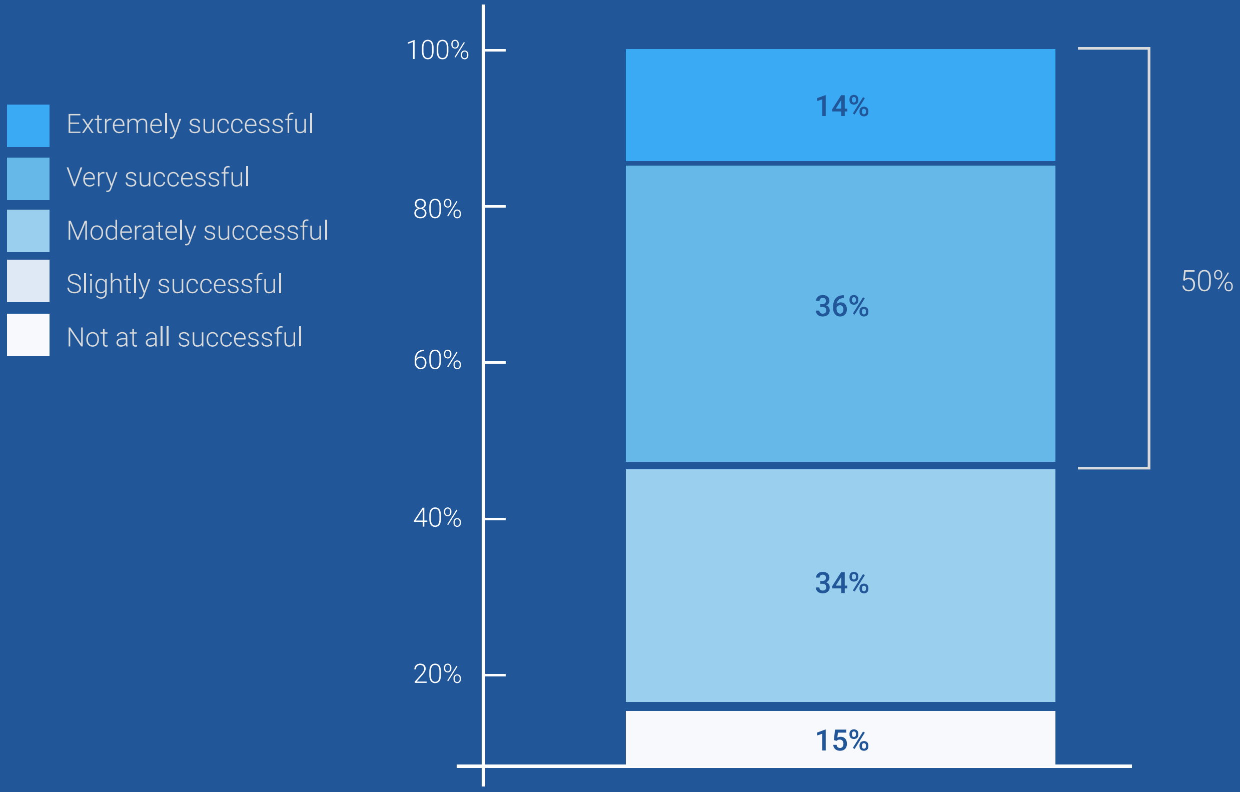
SUSTAINABILITY DEDICATION & SUCCESS

Most respondents surveyed said their company doesn't have a substantial number of employees dedicated to sustainability efforts, and respondents were split on if their firms' sustainability efforts were successful in the past five years.

But some industry experts say this may be a matter of how the industry has focused too narrowly on sustainability instead of recognising the holistic efforts construction has made in recent years in its achievement of environmental success.

> *'I think unfortunately for a lot of AEC firms sustainability has got this siloed mentality and approach. They think it's a check box. They think it's like one element of the project – we have to check "yes" or "no" and they think it's really costly to become "yes" or "no", when in reality they're actually doing so many things that could make them sustainable.'*
>
> – James Chambers, Director, Global Industry Development, Nemetschek Group

SUCCESS OF SUSTAINABILITY EFFORTS IN LAST FIVE YEARS

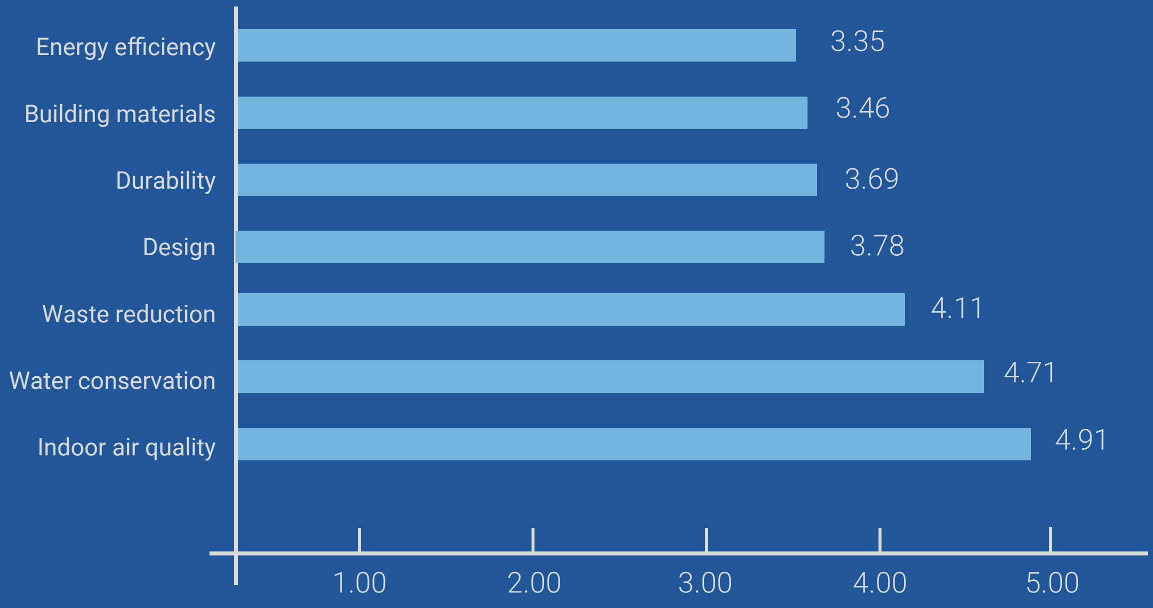


ENERGY EFFICIENCY A TOP PRIORITY

Survey participants ranked energy efficiency as the most important sustainable construction principle, followed by building materials and durability.

Sustainable construction principles vary from company to company, but they generally refer to ways or methods adopted to cut down on or eliminate material waste, construct buildings to operate more efficiently or improve a building's overall emissions footprint.

RANKING OF IMPORTANCE OF SUSTAINABLE CONSTRUCTION PRINCIPLES



A NEW ERA FOR CONSTRUCTION

The AEC industry has come a long way in a relatively short period of time on a number of significant measures of progress. As evidenced by this report, the industry's adoption and use of technology has accelerated mightily in the post-COVID economy. More recently, it has shown an urgency to invest in and embrace new technologies like AI, with some companies already dedicating significant investment towards operationalising these tools.

Still, while the industry has shown a new sense of speed in the use and adoption of technology across the building and operations lifecycle, this report shows that it has remained diligently cautious on managing the risks that come with these new endeavours.

On sustainability, this report shows that the AEC industry is still struggling to define and manage efforts successfully. Companies remain unclear on how effective current spending on 'sustainability initiatives' is, and as many respondents showed, their strategies around environmentally friendly plans are largely a work in progress. This is especially the case in North America, where stringent regulations and standards around sustainable building are not yet as pervasive as in Europe and elsewhere.

Despite these needed improvements, the industry's increased focus on sustainability in recent years has come a long way – and, based on this report, appears poised to continue to make greater progress in the years to come.

Finally, while technology has overtaken many of the AEC industry's essential workflows, the use of paper and analogue processes has proven resilient in some areas. Through either resistance to change or lack of focused technology training, paper has managed to stick around in construction more than in most other industries – despite the fact that many of today's technological capabilities can effectively perform these paper-based processes and workflows.

Digital signatures and approvals – a critical workflow in the building lifecycle – remain largely analogue for many firms due to lack of trust in technology. However, many industry tools, especially within Bluebeam, have secure and intuitive solutions for digital signatures and approvals.

The architecture, engineering and construction industry has an undoubtedly bright future. As this report shows, its evolving embrace of technology, focus on sustainability and overall progress in building innovation have made it among the top drivers of the global economy – today and long into the future.

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